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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/259,762	03/01/1999	ZHIPING YIN	303.531US1	5661

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EXAMINER

DIAZ, JOSE R

ART UNIT PAPER NUMBER

2815

DATE MAILED: 01/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/259,762

Applicant(s)

YIN ET AL.

Examiner

José R Díaz

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AW

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 14 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-3,5-11,21-28 and 31-38 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,5,7-11,21-24,26-28,31-34 and 36-38 is/are rejected.
- 7) ☒ Claim(s) 6,25 and 35 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3, 5, 7-11, 21-24, 26-28, 31-34 and 36-38 are rejected under 35 U.S.C. 102(e) as being anticipated by Yin et al. (US pat. No. 2002/0140056 A1).

3. The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Regarding claim 1, Yin et al. teaches a method comprising forming a silicon nitride film (7) on a substrate (see Fig. 5); treating the film in vacuum of about 3.0-6.5 torr (see Table II), for a time of about 10 seconds to about 5 minutes (see Table II and paragraph [0037]), and in an atmosphere comprising oxygen plasma having a flow rate of at least about 300 sccm oxygen (see Table II and paragraph [0037]); and forming and patterning a resist layer (3) (see Figs. 7-8). With regards to the deep ultraviolet

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lithography, Yin et al. teaches that any well-known lithography technique can be used after the plasma-treated anti-reflective coating is accomplished (see last sentence in paragraph [0044]). As evidence that DUV lithography is such a well-known technique, the examiner cites Wolf et al., "Silicon Processing for the VLSI ERA, Volume 1: Process Technology", Lattice Press, 1986, p. 407 and 427-428.

Regarding claims 2, 22 and 32, Yin et al. further teaches an energy source of about 150-900 watts (see Table II).

Regarding claims 3, 23 and 33, Yin et al. further teaches that the electrodes are about 400-600 mils apart (see Table II).

Regarding claims 5, 24 and 34, Yin et al. further teaches that the energy source is RF energy (see Table II).

Regarding claims 7-9, 26-28 and 36-38, Yin et al. further reducing footing and undercutting (see paragraph [0009] and figs. 1-4).

Regarding claim 10, Yin et al. further teaches that the oxygen flow rate is not greater than about 2000 sccm (see Table II).

Regarding claim 11, Yin et al. further teaches adding an inert gas to the oxygen gas (see Table II).

Regarding claims 21 and 31, Yin et al. teaches a method comprising forming a silicon nitride film (7) on a substrate (see Fig. 6); treating the film in vacuum of about 3.0-6.5 torr, for a time of about 10 seconds to about 5 minutes, and in an atmosphere comprising oxygen plasma having a flow rate of at least about 300 sccm oxygen to

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about 2000 sccm and helium in concentration of about 400-1000 sccm (see Table II); and forming and patterning a resist layer (3) (see Figs. 7-8).

### ***Allowable Subject Matter***

4. Claim 6, 25, and 35 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. The following is a statement of reasons for the indication of allowable subject matter: the prior art fails to teach, disclose, or suggest, either alone or in combination, a method comprising the step of treating a silicon-nitride film with an oxygen plasma prior to forming a resist layer, wherein the oxygen plasma is formed in a vacuum chamber comprising a pressure of about 3.0 - 6.5 torr, a time of about 10 seconds to about 5 minutes, and an atmosphere comprising oxygen gas and an inert gas, wherein the flow rate of the oxygen gas is at least about 300 sccm and the inert gas is not argon.

### ***Response to Arguments***

6. Applicant's arguments with respect to claims 1-3, 5, 7-11, 21-24, 26-28, 31-34 and 36-38 have been considered but are moot in view of the new ground(s) of rejection. Please note that Yin et al. anticipates the new limitation incorporated in claims 1, 21 and 31 (see above).

### ***Conclusion***

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

8. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

### ***Correspondence***


9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to José R Díaz whose telephone number is (703) 308-6078 or (571) 272-1727, after February 9, 2004. The examiner can normally be reached on 9:00-5:00 Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7722.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JRD

  
**GEORGE ECKERT**  
**PRIMARY EXAMINER**